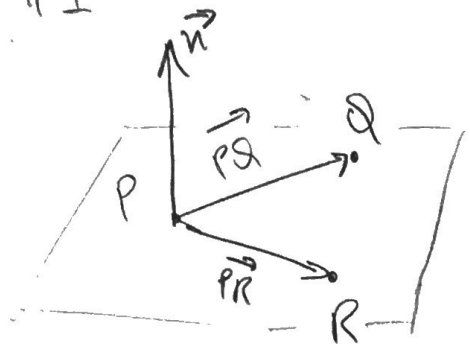


#1



$$\vec{PQ} = Q - P = (-3, -3, 2)$$

$$\vec{PR} = R - P = (-1, -1, 2)$$

$$\vec{n} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ -3 & -3 & 2 \\ -1 & -1 & 2 \end{vmatrix} = (-4, 4, 0)$$

$$\langle (x, y, z) - P, \vec{n} \rangle = 0$$

$$\langle (x-2, y-3, z+1), (-1, 1, 0) \rangle = 0$$

$$-(x-2) + (y-3) = 0$$

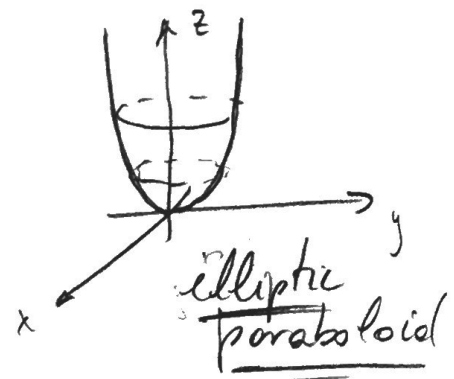
$$\boxed{-x + y - 1 = 0}$$

or

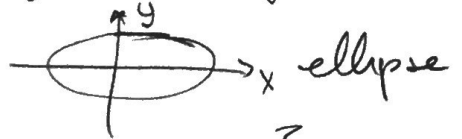
$$\boxed{x - y + 1 = 0}$$

#2

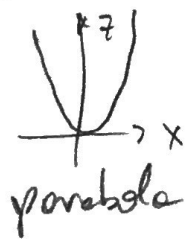
a) $z = x^2 + 2y^2$



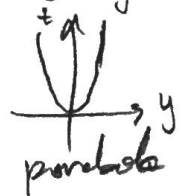
$z = c: x^2 + 2y^2 = c$



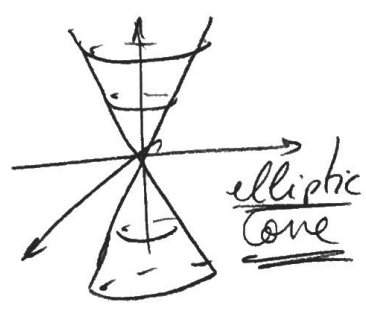
$y = 0: z = x^2$



$x = 0: z = 2y^2$



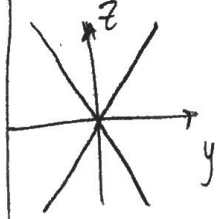
b) $z^2 = x^2 + 2y^2$



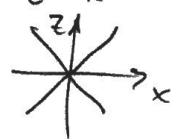
$z = 0: x^2 + 2y^2 = 0 \Leftrightarrow (x, y) = (0, 0)$



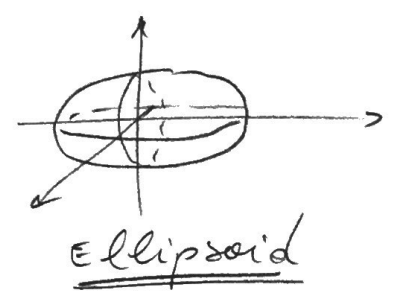
$x = 0: z^2 = 2y^2 \Leftrightarrow z = \pm \sqrt{2} \cdot y$



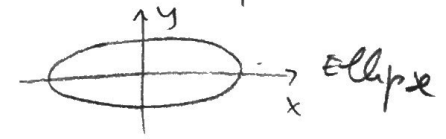
$y = 0: z^2 = x^2$



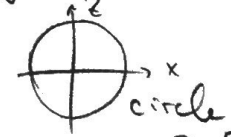
c) $x^2 + 2y^2 + z^2 = 1$



$z = 0: x^2 + 2y^2 = 1$



$y = 0: x^2 + z^2 = 1$



$x = 0: 2y^2 + z^2 = 1$

